CASE STUDY

Ability to Build Hyper-Scale Data Centers at Hyper-Speed Helps Eliminate IT Expansion Risk and Uncertainty

CyrusOne's new Northern Virginia - Sterling II data center, built with Massively Modular® Engineering methods, sets construction speed record to meet customer demand for custom, built-to-suit data center

CyrusOne®

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Abstract

In June 2016, CyrusOne completed the Sterling II data center at its Northern Virginia campus. A custom facility featuring 220,000 square feet of space and 30 MW of power, Sterling II was built from the ground up and completed in only six months, shattering all previous data center construction records. The Sterling II facility represents a new standard in the building of enterprise-level data centers, and confirms that CyrusOne can use the streamlined engineering elements and methods used to build Sterling II to build customized, quality data centers anywhere in the continental United States, with a similarly rapid time to completion.

CyrusOne's quick-delivery data center product provides a solution for cloud technology, social media and enterprise companies that have trouble building or obtaining data center capacity fast enough to support their information technology (IT) infrastructure. In trying to keep pace with overwhelming business growth, these companies often find it hard to predict their future capacity needs. A delay in obtaining data center space can also delay or stop a company's revenue-generating initiatives, and have significant negative impact on the bottom line.

The record completion time of the Sterling II facility was the result of numerous data center construction principles developed by CyrusOne. These include standardized data center design techniques that enable CyrusOne and its build partners to customize the facility to optimize space, power and cooling according to customer needs; effective project management in all phases of design and construction, thanks to CyrusOne's established partnerships with data center architects, engineers and contractors; advanced supply-chain techniques that enable CyrusOne to manufacture or pre-fabricate data center components and equipment without disrupting work at the construction site; and the use of Massively Modular® electrical units and chillers to enable rapid deployment of power and cooling at the facility according to customers' IT capacity needs.

Introduction

In late December 2015, CyrusOne broke ground on the Sterling II data center, the second facility at its Northern Virginia campus. Built for specific customers, the Sterling II facility is a 220,000-square-foot data center with 30 MW of critical power capacity. The facility was completed and commissioned in mid-June 2016. Its under six-month construction time frame is the shortest known time to completion ever achieved by CyrusOne for an enterprise-scale data center of its size. The 180-day build time shattered all known industry construction records.

CyrusOne had previously set another industry record by delivering a 120,000-square-foot, 6MW facility in Phoenix, Arizona, in 107 days, or just over three months. The Sterling II facility is almost twice the size of the Phoenix facility, offers five times more power capacity and took only twice as long to deliver. Its record time to market represents a new industry standard in the construction and deployment of built-to-suit enterprise data centers.

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The Challenge

Many large-scale cloud, internet, social media and enterprise companies are growing at an unprecedented and unpredictable rate, with their IT footprints often doubling or tripling in size in just a few years. But rapid growth makes it harder for these companies to predict or plan for future IT infrastructure expansion.

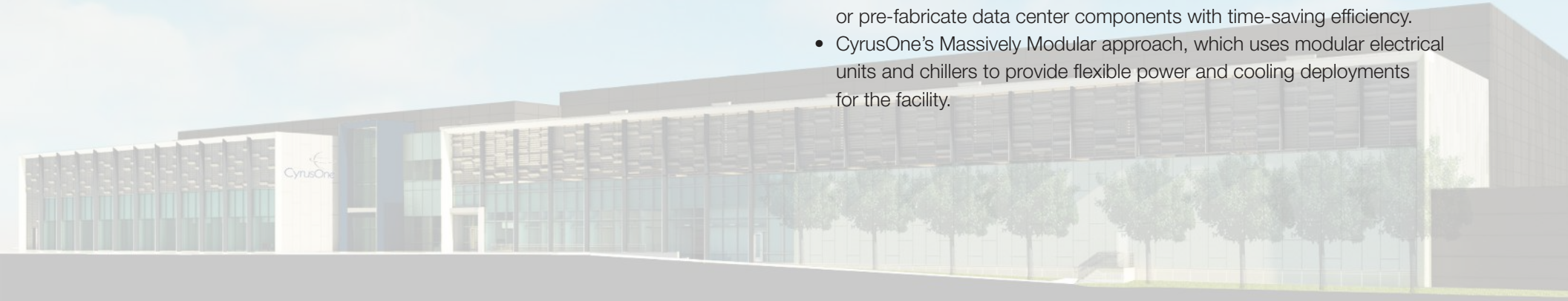
"When enterprises determine how much IT capacity they will require to handle future business growth, it often turns out that they needed it 'yesterday,'" explains John Hatem, CyrusOne's executive vice president of data center design, construction and operations. "But they can't build new data centers or buy colocation space fast enough to meet their skyrocketing IT infrastructure demands. In addition, the quest to build or obtain new data center space is a distraction from the company's core business, whether that's software development, cloud technology, social media or other business applications."

The Solution

CyrusOne Solutions™ build-to-suit IT deployments can deliver a completed, high-quality data center product, often in the same amount of time it takes enterprises to order and receive the computing equipment that will operate inside the facility. This rapid time to delivery helps relieve the customer's risk of not having adequate IT capacity to support their key business growth, or the infrastructure demands of new initiatives. Significantly, CyrusOne is typically able to deliver this data center product with lower construction, engineering and operational costs to the customer.

The Sterling II and Phoenix enterprise data centers were completed in record time thanks to CyrusOne Solutions' streamlined construction and IT deployment approach, which includes:

- CyrusOne's signature Massively Modular engineering disciplines, which employ standardized data center design using pre-fabricated components and template construction techniques.
- Effective project management by the CyrusOne Solutions team through productive and collaborative relationships with experienced data center architects, engineers and contractors involved in the project.
- Advanced supply-chain techniques that enable CyrusOne to manufacture or pre-fabricate data center components with time-saving efficiency.
- CyrusOne's Massively Modular approach, which uses modular electrical units and chillers to provide flexible power and cooling deployments for the facility.



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Massively Modular Construction

"We think of building our data centers as a manufacturing process, not a construction process," Hatem says. "We deliver the same high-quality product to all of our customers, which is a reliable data center with space, power and cooling. Using a standardized data center design and components enables us to deploy a similar product anywhere in the continental United States, with the fastest time to market available."

Through its Massively Modular construction/engineering methods, CyrusOne builds data centers in standardized building blocks with 60,000 square feet of infrastructure and 4.5 MW of power. For customized data center projects, CyrusOne builds as many blocks as the customer requires. The Phoenix data center consists of two building blocks, while the Sterling II data center consists of five building blocks (with additional power capacity added). Using this standardized layout as a basis, CyrusOne can then customize the design of a built-to-suit data center to optimize space, power and cooling according to the individual customer's IT needs.

Effective Project Management Through Industry Partnerships

To build the Sterling II facility, CyrusOne Solutions put together a project-management team that included outside architects, engineers and contractors who had worked with CyrusOne on previous data center builds. By working with these industry experts, CyrusOne was able to plan and execute the Sterling II project so the facility could be built in a very short time.

"I can't say enough about the entire team that worked on the project," says Laramie Dorris, CyrusOne's vice president of design and construction. "That includes the architect and engineering team, general contractors, third-party consultants, structural and civil engineers, and local contractors in Northern Virginia, who all pulled together to manage and execute this project. A project like this runs 24/7 for the entire duration, and it was incredible to watch everyone working together in a collaborative, cohesive effort to meet the project requirements and finish the facility within the established six-month time frame."

Corgan, a Dallas firm, is the architect of record for the Sterling II facility. According to Mike Connell, who served as Corgan's project manager on Sterling II, "One reason for CyrusOne's success is they don't try to micromanage a data center project from the top down. Instead, they hire the right people, build the right teams and empower project managers to make important decisions based on their roles. It makes their construction projects run more smoothly and efficiently.

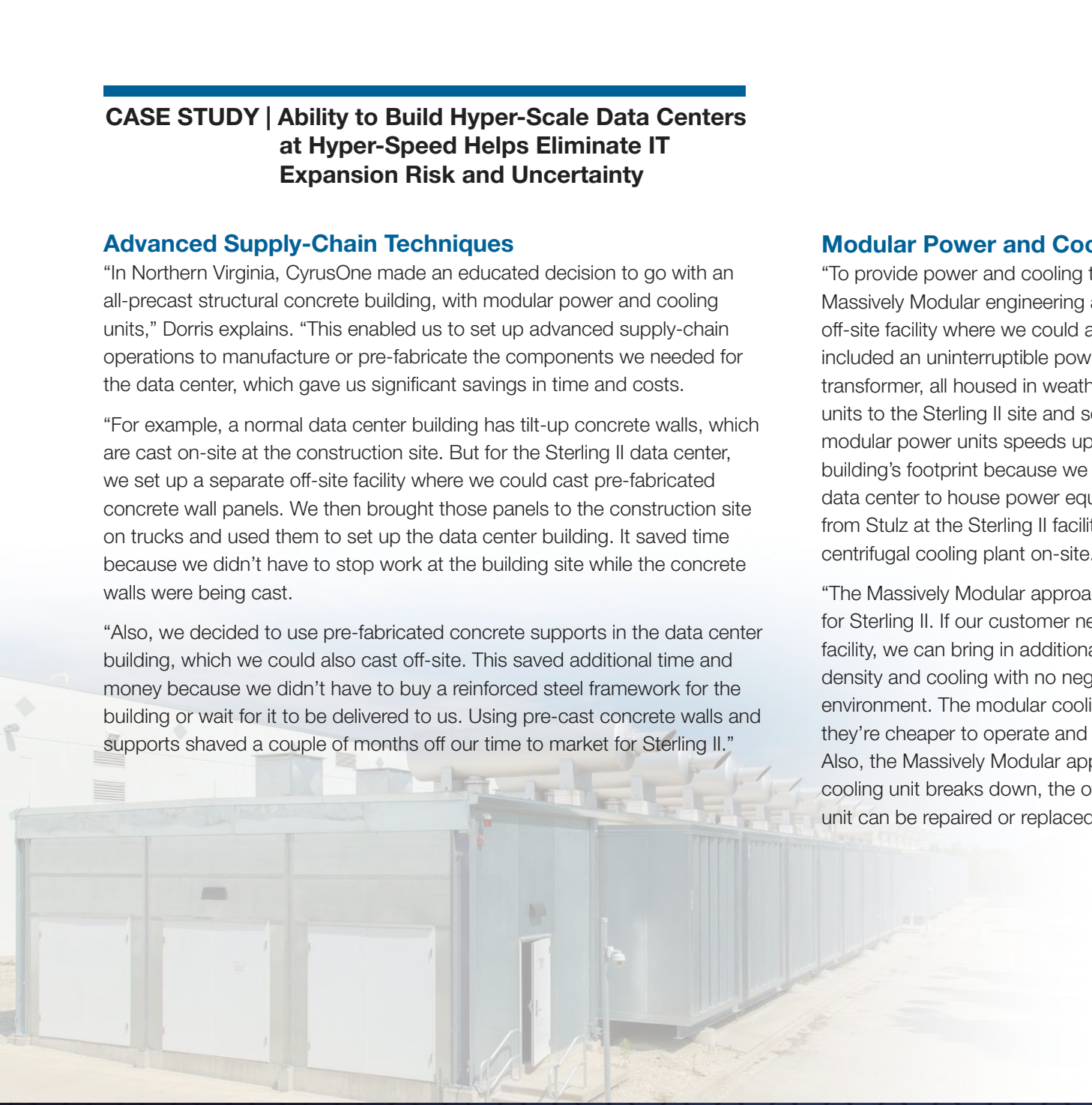
"For Sterling II, CyrusOne provided Corgan with the basis of design, a budget and a time frame for building the data center, and let our engineers take care of the rest. We were able to give them several design options and tell them the impact on construction, schedule and cost for each option. The confidence that CyrusOne showed in our engineers enabled them to use their creativity to meet the challenge and solve the problems of building a facility in just six months. Our engineers are able to work smarter and harder when they aren't being overly managed by the client."

Advanced Supply-Chain Techniques

"In Northern Virginia, CyrusOne made an educated decision to go with an all-precast structural concrete building, with modular power and cooling units," Dorris explains. "This enabled us to set up advanced supply-chain operations to manufacture or pre-fabricate the components we needed for the data center, which gave us significant savings in time and costs.

"For example, a normal data center building has tilt-up concrete walls, which are cast on-site at the construction site. But for the Sterling II data center, we set up a separate off-site facility where we could cast pre-fabricated concrete wall panels. We then brought those panels to the construction site on trucks and used them to set up the data center building. It saved time because we didn't have to stop work at the building site while the concrete walls were being cast.

"Also, we decided to use pre-fabricated concrete supports in the data center building, which we could also cast off-site. This saved additional time and money because we didn't have to buy a reinforced steel framework for the building or wait for it to be delivered to us. Using pre-cast concrete walls and supports shaved a couple of months off our time to market for Sterling II."



Modular Power and Cooling

"To provide power and cooling to the Sterling II facility, we used CyrusOne's Massively Modular engineering approach," Dorris says. "We set up another off-site facility where we could assemble modular power units. Each unit included an uninterruptible power supply (UPS), a backup generator and a utility transformer, all housed in weatherproof containers. We brought the modular units to the Sterling II site and set them up in 'lineups' outside the facility. Using modular power units speeds up construction, saves money and reduces the building's footprint because we don't have to build additional rooms inside the data center to house power equipment. Also, we used modular cooling units from Stulz at the Sterling II facility, which saved us from having to build a large centrifugal cooling plant on-site.

"The Massively Modular approach provides flexible power and cooling options for Sterling II. If our customer needs to change their IT deployment within the facility, we can bring in additional power units and chillers, and increase power density and cooling with no negative impact or downtime on their current environment. The modular cooling units help lower operating costs because they're cheaper to operate and maintain over a regular on-site cooling plant. Also, the Massively Modular approach provides redundancy. If a power or cooling unit breaks down, the others will take up the slack until the broken unit can be repaired or replaced."

Conclusion

CyrusOne Solutions' built-to-suit data center product is the best solution for cloud, internet or enterprise customers who need quality data center facilities built in the shortest time possible. The standardized construction approach is a repeatable process employable in multiple locations to ensure rapid speed to market for data center projects, with significant cost savings for customers.

By delivering data centers like the Sterling II and Phoenix facilities in record times, CyrusOne is continuously setting the bar higher for the data center industry. Additionally, CyrusOne is helping ensure its customers are able to scale at hyperspeed to meet their data center capacity needs by removing the risks of running out of space or power.

"CyrusOne has a culture of dedication to client service that starts with their executives and permeates throughout their company," Connell adds. "When a customer asks them to do something, instead of saying no, they try to figure out ways to make it happen."

About CyrusOne

CyrusOne (NASDAQ: CONE) specializes in highly reliable enterprise-class, carrier-neutral data center properties. The company provides mission-critical data center facilities that protect and ensure the continued operation of IT infrastructure for hundreds of customers, including many of the Fortune 1000.

CyrusOne's data center offerings provide the flexibility, reliability and security that enterprise customers require, which are delivered through a tailored, customer service-focused platform designed to foster long-term relationships. CyrusOne's National Internet Exchange (IX) provides robust connectivity options that help drive revenue, reduce expenses and improve service quality for the enterprise. CyrusOne is committed to full transparency in communication, management and service delivery throughout its worldwide footprint of enterprise data centers.

Learn more at CyrusOne.com.

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Kevin Timmons
Chief Technology Officer

Kevin Timmons is responsible for defining and sharing the technology roadmap for the company. He is also responsible for the site selection, design and construction of CyrusOne's worldwide data center assets. Before CyrusOne, he led Microsoft's global data center team as general manager, data center services. In his two years at Microsoft he fundamentally changed the way that the company designed, developed and operated of its world-wide data center assets. Under his leadership, Microsoft opened four of the world's largest data centers. These facilities were recognized for their innovation and industry-leading cost performance.

Kevin's background also includes over 10 years of experience in real-time embedded systems software development with several leading aerospace firms such as Lockheed and Marconi Dynamics. He was instrumental in the development of the avionics display systems for the YF-22 fighter program, which was later selected by the U.S. Air Force as their next-generation fighter platform, the F-22 Raptor.

Laramie Dorris
Vice President of Data Center Design and Construction

Laramie Dorris is the Vice President of Data Center Design and Construction at CyrusOne, and is responsible for enterprise wide project development & execution of data center construction projects. In his years at CyrusOne, Laramie has been responsible for overseeing CyrusOne's 2014 record-breaking 107-day Chandler I campus completion in Phoenix, Arizona, as well as the arguably more aggressive 180-day Sterling II facility completion in 2016 located in Northern Virginia.

Prior to joining CyrusOne, Laramie was a seasoned construction and design executive for mission critical construction firms. He also previously worked at J.P. Morgan and Bear Sterns on a wide range project. Laramie has managed both domestic and international projects.